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Full Counting Statistics of a Quantum Point Contact with Time-dependent Transparency[1] JIN ZHANG, YURY SHERKUNOV, NICHOLAS D'AMBRUMENIL, BORIS MUZYKANTSKII, Department of Physics, University of Warwick — Controlled injection of single electrons into a ballistic conductor is essential for "moving-electron-based" quantum computation. We consider an electron system in two 1D ballistic conductors separated by a tunneling barrier at zero temperature. We present numerical results for the full counting statistics (FCS) for the case when the barrier potential is modulated in the presence of a time-dependent bias voltage applied between the leads. The calculation is based on Abanov and Ivanov's formula[1]. For the case of a periodic input with a large number of cycles, we perform the calculation in discretized energy space and obtain the characteristic function $\chi(\lambda)$ as well as physical observables such as the current, noise and entanglement entropy directly. We show how to optimize the gate potential of a quantum point contact to generate a single electron excitation with minimal noise.
[1]A.G. Abanov and D.A. Ivanov, *Phys.Rev.Lett.*, 100, 086602

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